Data Center Energy Efficiency: Setting the Context

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Presentation Outline

- About ECO-III Project
- Why Data Center Energy Efficiency
- Draft Barriers, Strategies, and Next Steps

About ECO-III Project

ECO-III Objectives

- Assist BEE in implementation of the Energy Conservation Act
  - Energy Conservation Plan and Implementation in Gujarat and Punjab
  - Implementation of Energy Conservation Building Code (ECBC)
  - Emphasis on energy efficiency in buildings, municipalities, and SMEs
- Help develop institutional capability
  - Regional Energy Efficiency Centers
  - Promote Energy Services Sector
- Awareness and Outreach
  - Architectural Courses with Energy Efficiency Focus
    - Architectural/Building Science
    - Energy Modeling
  - Capacity Building of Building Design and Energy Efficiency Professionals

ECO-III Team - A Unique Blend

- Uniquely Positioned to Address Energy Efficiency in India
  - Policy as well as technical issues
  - Right mix of Indian and international professionals
- Management and Administrative Support from IRG HQ
- Field Office Staff
  - Team of ten professionals (incl. one field person in Gujarat)
  - Ability to engage Subject Matter Experts for specific activities

ECBC Milestones

- Milestones
  - Provided strategic and technical input in ECBC Launch Workshop
  - Prepared “Intro to ECBC” brochure as part of ECBC Awareness
  - Building Envelope and Lighting (draft) Tip Sheet ready;
  - Draft Design Guides on Glazing Design and Selection and Lighting Tips ready
  - Four ECBC Awareness workshops - Delhi, Chandigarh, Vadodara, Pune
    - Helping develop capacity of GEDA, PEDA, and MEDA
  - Energy Modeling workshops in Ahmedabad and Delhi
- Key Partners: Alliance to Save Energy (Washington DC office), CEPT, and KGA
- Beneficiary: BEE, GEDA, PEDA

ECBC - Future Activities

- Developing technical resources for ECBC implementation
  - ECBC Tip Sheets for HVAC and Energy Simulation to be completed by February 2008
  - ECBC User Guide to be completed by June 2008
  - Design Charette with a renowned architect and a team of consultants - create a video film to be used in training and architectural classrooms on the process of designing ECBC compliant buildings
  - Help develop ECBC compliance checklists
- Assist BEE to structure and launch a national program on ECBC Awareness and Training
  - Identify institutions that can offer training and awareness
  - Provide training to BEE's panel of speakers and trainers by supplying content and speaker notes

ECBC – Long-Term Capacity Building

- Background survey conducted targeting 140 architectural schools
- E Source Technology Atlas - Best reference identified for ECBC
  - Negotiated a 75% discount - $250 (at cost) for 5 volume reference
  - To be distributed to 15-20 academic institutions and 10-15 NPOs
  - MoP, BEE, and USAID to be present at the event
- Negotiated a 75% discount on DesignBuilder software to equip computer labs with state of the art DesignBuilder/EnergyPlus software
  - $210/license (minimum 10 licenses to support curriculum work)
- Identified members of International Committee to support development of two new courses - Building Science (Undergraduate) and Energy Modeling (Post-Graduate)
- Preparing a “Train the Trainers” or “Professors on Sabbatical” to help develop capacity at Indian institutes
- Key Partners: CEPT, ASE, WinBuild, E Source, DesignBuilder Software
- Beneficiaries: Architectural and Engineering Colleges of India, BEE

ECO-III Outreach and Extension Activities

- Provided Strategic and Technical input to BEE for a USAID-USEPA workshop on Energy Efficiency Procurement
  - Helped develop the technical agenda and background materials for the workshop
  - Two presentations made by IRG
  - Supported the visit of Jeff Harris (ASE), International Expert on EE procurement
- In association with LBNL, promoting energy efficiency in Data Centers in India.
  - Assist in market transformation and capacity building for energy efficiency in Indian IT/ITES data centers;
  - Transfer international best practices and benchmarks in the design, construction, operation and maintenance of data centers;
  - Partners: BEE, CII, NASSCOM.
- Study tour to be planned in discussion with USAID and BEE
  - Tentative date for the trip: May 2008
- Key Partners: EPA, DOE, LBNL, CII, NASSCOM
- Beneficiaries: BEE, GEDA, PEDA

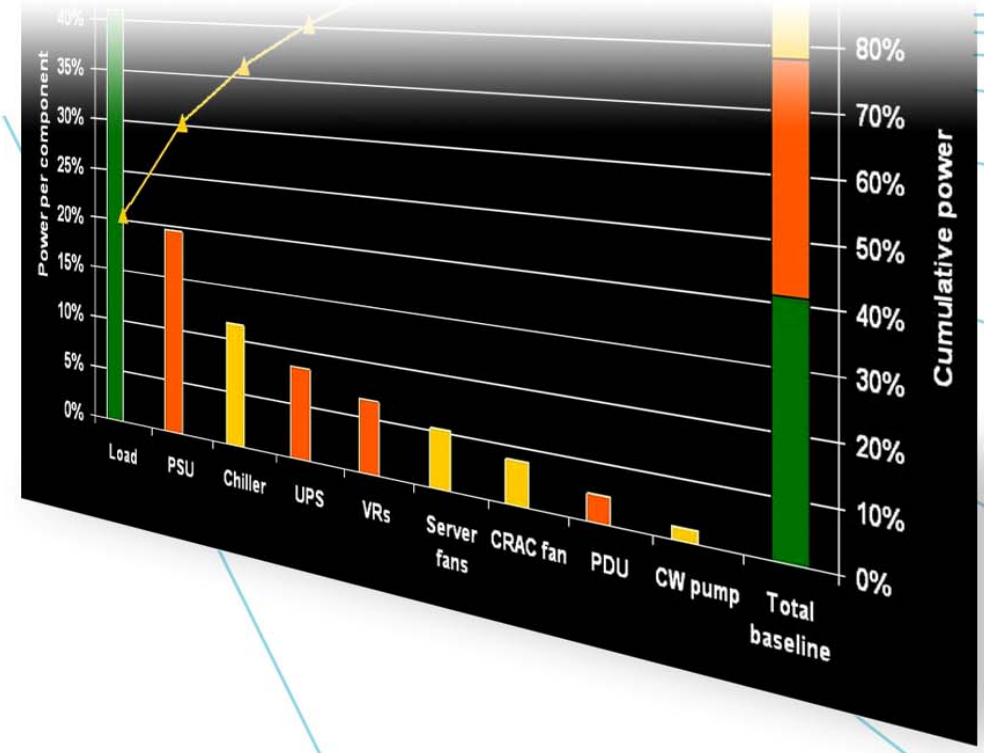
About the Workshop

Objectives

- Raise awareness of data center energy intensity and efficiency opportunities
- Group interaction for common issues and possible solutions
- Provide catalytic and facilitation role to help assemble an industry-government group

Technical Topics to be Covered

- Major energy use in data centers
- Opportunities to increase computational efficiency and the multiplier effect
- Energy intensity growth
- Benchmarking opportunities (how do I stack up?)
- Best practices to improve infrastructure efficiency
- Extending the life and effective capacity of existing data centers
- Technologies coming down the R&D pipeline and lessons learned from demonstrations
- Information and technical assistance resources

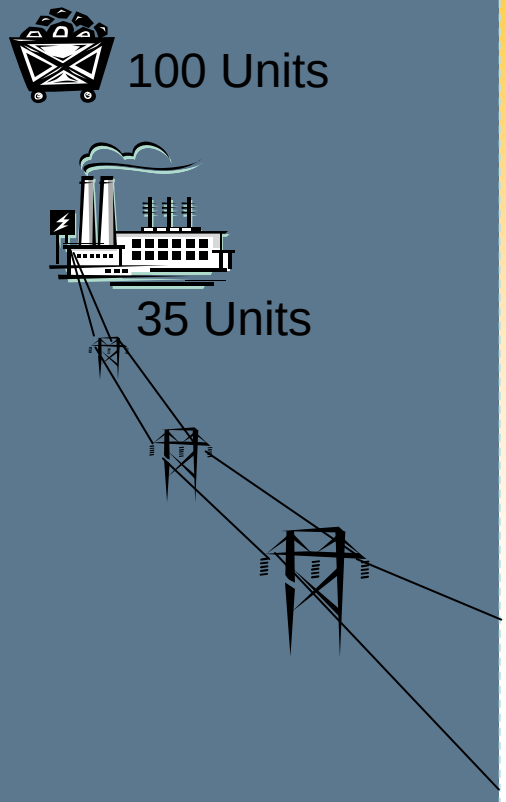


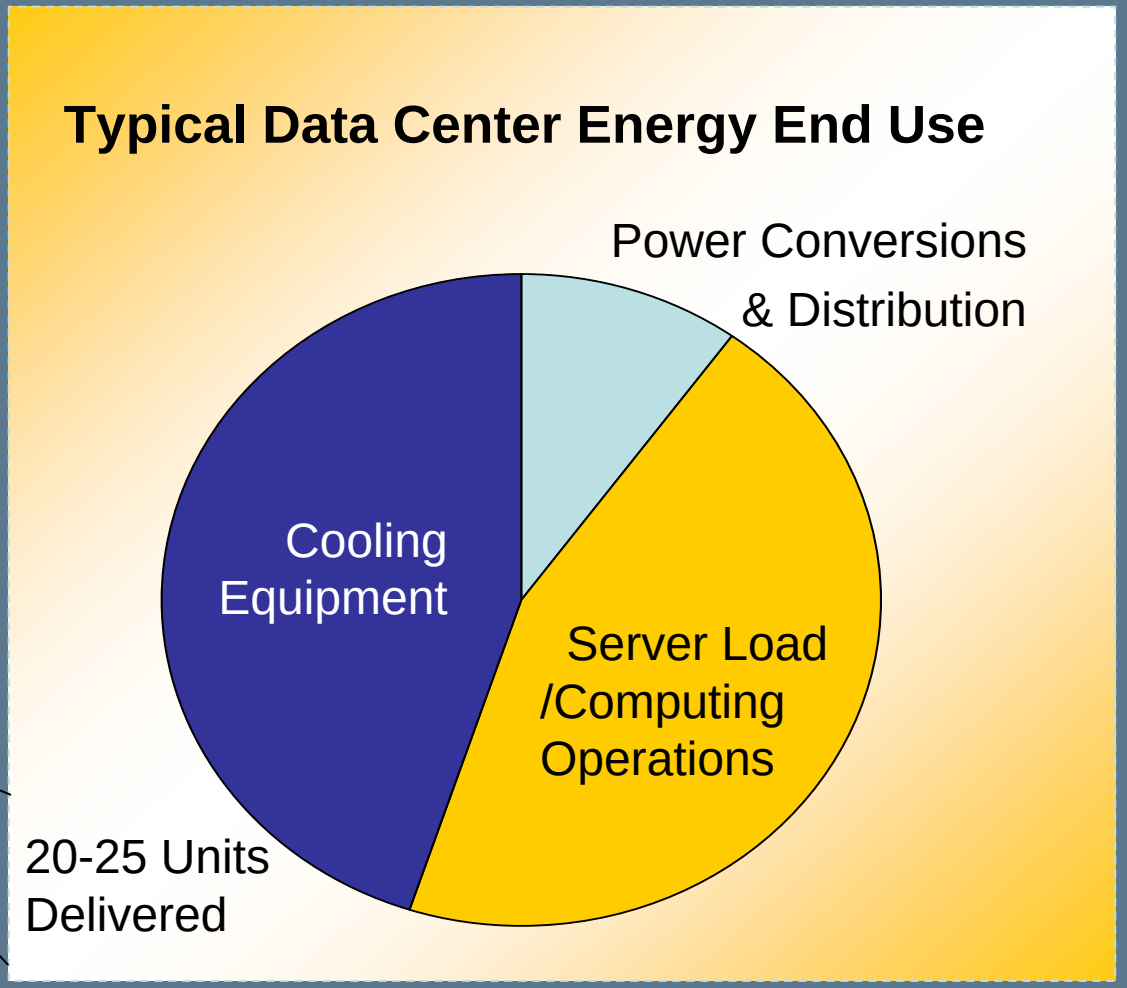
Overview of Data Center Energy Use

Why Data Centers

- Highly energy-intensive and rapidly growing
- Consume 10 to 100 times more energy per square foot than a typical office building
- A single rack of servers can use up t0 20 kW
  - Rs. 1.5 million per year per rack (at Rs. 0.10/kWh)
  - Hundreds of racks per center
- Where are the opportunities?

Where Does it Go?





Draft Barriers, Strategies, and Next Steps

Barriers to Data Center Energy Efficiency

- Lack of institutional framework
- Risk Averseness
  - Emphasis on reliability and redundancy
- Lack of value proposition
  - Better cost information
- Informed Regulatory Push (e.g. ECBC) Coupled with Incentives
- Lack of awareness
  - Lack of exposure to best practices
  - Lack of Technical Expertise
  - Lack of good design information (e.g. management of cooling loads and air distribution)
  - Lack of comparative benchmark data
- Lack of Interaction between IT and facility staff
- Lack of integrated building design approach
- Power Distribution (energy loss at every point)
  - Lack of available energy-efficient solutions (e.g. DC based power supply systems)
- Infrastructure not keeping up with IT technology
- Quality and reliability of power supply

Data Center Energy Efficiency Strategies

- **Create Information/Awareness Framework**
  - ***Industry forums: awards, workshops***
  - ***Public Domain Knowledge: case studies, best practices, etc.***
  - ***CEO value proposition (e.g. business case document and presentation)***
- **Perform Capacity Building/Training**
  - ***Curriculum (Higher education, Corporate learning)***
  - ***Design Charette – facilitation and guidelines***
  - ***Sample contract documents (Incentives)***
- **Develop Performance Indicators and Benchmarking Framework**
  - ***Agree on indicators, collect data, disseminate to promote best practices***
- **Create Regulatory, Standards, and Incentives Framework**
  - ***GAP Analysis;***

Proposed Next Steps

- **Identify Stakeholders and Broaden Participation**
  - **Industry (CII, NASSCOM, Data Center Owners, Product and Service Providers, etc.)**
  - **Government (MoP, BEE, Electricity Regulatory Commissions)**
  - **Facilitators and Catalytic Agents**
- **Help establish a public-private partnership (e.g. Green Grid initiative in the US) to carry the agenda forward**
- **Present on Thursday (draft findings and recommendations)**
  - ***Distribute draft barriers and strategies and build on it***
  - ***Develop Action plan/Roadmap***
  - ***Solicit support/involvement***

Thanks!!!

For More Information, please contact

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